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A REVIEW OF 600 HYSTERECTOMIES  
PERFORMED AT YALE-NEW HAVEN HOSPITAL:  
Comparison of abdominal and vaginal approaches

Steven C. White

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A REVIEW OF 600 HYSTERECTOMIES  
PERFORMED AT YALE-NEW HAVEN HOSPITAL:  
COMPARISON OF ABDOMINAL AND VAGINAL APPROACHES

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A.B., Boston University, 1965

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This thesis would not have been written without the devotion of Lisa Underwood.

*To my Little Ones  
Gill and Alice  
where it's really at.*



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## INTRODUCTION

Three-hundred abdominal and 300 vaginal hysterectomies, each group drawn equally from University, private, and ward cases, are compared. The indications for the hysterectomies are analyzed to determine the most suitable approach--abdominal or vaginal--under various circumstances. There are times when only abdominal hysterectomy is adequate, such as in the presence of ovarian disease. Likewise, vaginal hysterectomy is the sensible procedure if cystocele or uterine prolapse exist, assuming there are no lesions necessitating laparotomy. In other instances, either operation is possible. The choice of approach in these cases can still be made intelligently with a sound knowledge of the advantages and drawbacks of each method.

Abdominal and vaginal hysterectomies have different patterns of post-operative complications. Knowledge of what complications are most likely to occur with each procedure can help decide the approach to use. For instance, if pulmonary complications are found more often after abdominal hysterectomy, it may be desirable to choose vaginal hysterectomy for the patient who has had several episodes of pneumonia. Even if it is necessary to do abdominal hysterectomy in the above case, the awareness of the complications allows the physician to take the necessary precautions to prevent them.

The purpose of this thesis is to clarify the circumstances under which each type of hysterectomy should be performed and to provide an awareness of the complications that may arise.





## METHODS

Six-hundred hysterectomies performed at Yale-New Haven Hospital were selected, 200 from each of the 3 services--ward, private, and University full-time faculty. Half of each service were vaginal hysterectomy cases and half, abdominal. Subtotal and Wertheim hysterectomies were included and represent the simplest and most complicated operations considered under abdominal hysterectomies. Exenterative surgery was not included, as its mortality and morbidity would not have been at all indicative of simple abdominal hysterectomies, and since there were no comparably difficult vaginal cases. The hysterectomies selected for this study were taken consecutively from the gynecology service reports. There were enough such operations done in 1962 and 1963 to fill both ward and private groups of 100. These dates assured a five-year follow-up, so that long term complications emerge for application to present surgery. Unfortunately, there were fewer University cases done annually. The years from which cases were selected were 1962-1965 for abdominal hysterectomies and 1958-1968 for vaginal hysterectomies. If service reports preceding 1958 had been available, hysterectomies done in 1955-1957 would have been substituted for those performed after 1965, so that at least a three-year follow-up would have been available on all patients. Included in this study were 13 University vaginal hysterectomies performed in 1965, 9 in 1967, and 4 in 1968.

The following information was extracted from the hospital charts: name of patient, name of surgeon, unit number, birth date, age at operation, race, religion, marital status, duration of post-operative



hospital stay, patient status (private, University, or ward), last menstrual period, gravidity, parity, and number of abortions. Relevant past medical history was noted, with particular emphasis placed on cardiovascular, pulmonary, renal, and gynecologic problems. Previous surgery was recorded, broken down into the following categories: abdominal, pelvic, and other. Besides recording whether the present operation was a vaginal, total or subtotal abdominal or Wertheim hysterectomy, all associated procedures were noted. These included salpingectomy, oophorectomy, anterior and posterior colporrhaphy, appendectomy, dilation and curettage, and about 25 less commonly associated procedures. The type of anesthesia, estimated blood loss, and number of transfusions (before, during, and after operation) were noted. The number of days that a catheter was in place and the use of drains or vaginal packing were recorded. The primary indication for hysterectomy was taken from the service reports. Secondary symptoms and signs justifying hysterectomy were noted. If the post-operative diagnoses were different, they were recorded.

The complications of hysterectomy can be broken into 3 categories--those occurring at operation, those in the first post-operative weeks, and those that became apparent months or years post-operatively. The operative complications included ureter and bladder injury, perforation of the uterus and some of the hemorrhages. Short-term complications included hemorrhage, shock, fever (to at least 100.4 F. for 2 days), wound infection, vaginal cuff hematoma and infection, intestinal obstruction, urinary tract infection, urinary retention, phlebitis, and pulmonary complications.



The long-term complications included some of the cases of intestinal obstruction (those resulting from adhesions from surgery), persistent urinary tract difficulties, uretero-vaginal, rectovaginal, and vesical fistulas, shortening or stenosis of vagina, dyspareunia, granulation tissue in the vagina, and prolapse of the vaginal vault. Future pelvic surgery, such as removal of an ovary that had been retained at hysterectomy, was also considered a complication. The most significant long-term complications were the recurrences of conditions existing before hysterectomy--cystocele, rectocele, enterocele, or stress incontinence. Private physicians were sent questionnaires on their vaginal hysterectomy patients, asking about the success of the pelvic support. Because only 25% replied, it was impossible to draw valid conclusions about the long-term results. Since the University patients were often referred from outlying towns, these follow-ups were performed by the referring physician. Thus, only one-third of the original sample, the ward patients, was studied for the following complications: dyspareunia, granulation of vaginal vault, and recurrent or new cystocele, rectocele, enterocele, or stress incontinence.

Cancer cases were included in this study as part of the natural spectrum of hysterectomies, along with their post-operative morbidity and complications. The cancer patients were of insufficient number to attempt any survival statistics. Any discrepancies in pathology between the report and the post-operative diagnoses were noted.

The data was then transferred to sheets coding for 3 punched cards per patient. The first card had general information and present



operation, the second had the indications for hysterectomy, and the third had the complications. The results of the analysis, as well as the way the data was handled, is explained in the sections on "Indications" and on "Complications."

### The Characteristics of the Sample Group

The 600 hysterectomy cases were divided into 6 equal groups so that abdominal and vaginal cases could be compared, and so that it could be determined how the patients fared on the 3 services. However, the patients had differences going well beyond the expected socioeconomic deviations, and this had to be considered when comparing the groups for morbidity.

On the private and University services, the vaginal hysterectomy patients were nearly 10 years older than the abdominal patients. This was due to the large number of patients in their 50's through 70's who had vaginal hysterectomy for prolapsed uterus. The ward vaginal group, on the other hand, was dominated by patients with multiparity and pelvic relaxation in their late 20's and early 30's. Thus, this group was 15 to 20 years younger than the other vaginal hysterectomy groups; the average abdominal patient was in her early 40's, and the median ages were similar on the 3 services.

Table I

	<u>Median Age</u>	<u>Average Parity</u>	<u>No. of premenopausal patients</u>
Private Abdominal	43	2.2	92
Private Vaginal	50	3.0	51
University Abdominal	45	1.7	61
University Vaginal	55	3.3	45
Ward Abdominal	39	2.7	80
Ward Vaginal	35	6.1	92





The ward groups contained 108 of the 125 Negro patients in the study. They were about 7 years younger than their white counterparts; the average ward vaginal case, regardless of race, was a grand multiparous woman, and the difference in parity between black and white ward abdominal patients was insignificant. Race did appear to be a factor in the incidence of some of the post-operative complications, and this will be discussed later.

Table II

	No. of cases	Median Age	Average Parity
Negro Ward Vaginal Patients	47	30	7.0
White Ward Vaginal Patients	53	38	5.4
Negro Ward Abdominal Patients	61	37	2.4
White Ward Abdominal Patients	39	43	3.0

Most of the cancer surgery was referred to the University service and was approached abdominally. The University group had 18 of the 22 abdominal hysterectomies for endometrial carcinoma, all 6 Wertheim hysterectomies, and the three cases of ovarian carcinomatosis. This group could be expected to have additional post-operative morbidity due to the more extensive surgery involved in over one-fourth of the cases.

#### Operative Procedures Associated with the Hysterectomies

In addition to removing the uterus, other procedures are often done at the time of hysterectomy. Some, such as examination under anesthesia or dilation and curettage, are of little significance in terms of morbidity. Incidental appendectomy rarely causes difficulty. Abdominal hysterectomy commonly includes salpingectomy and oophorectomy, while vaginal hysterectomy is associated with anterior and posterior colporrhaphy. The vaginal plastic repair has become an integral part of most vaginal hysterectomies and adds considerably to the blood loss

and morbidity of the operation.



Sixty-eight percent of the abdominal cases had one or both ovaries removed. This rate was constant on all 3 services. Slightly less than 5% of the vaginal patients had an ovary removed. Removal of one or both normal ovaries may be a routine part of abdominal hysterectomy to prevent future disease, while ovaries removed during vaginal hysterectomy are those found to have lesions on inspection. Of the 14 vaginal cases with oophorectomy, 12 had follicular, corpus luteum, or dermoid cysts, and 2 had cystadenofibromas.

Of the private and ward abdominal oophorectomy cases, 50% had both ovaries removed, as compared to 75% on the University service. The explanation for this difference is that the University service had 37% cancer patients instead of the average 7% in the other 2 groups. Most of these patients required bilateral salpingo-oophorectomy; by deleting the 30 additional cancer cases on the University service, their rate for bilateral oophorectomies was also 50%.

Sixty-nine percent of the abdominal cases had one or both tubes removed. This figure was constant among the 3 services. Ninety-eight percent of the patients who underwent salpingectomy also had oophorectomy. Sixty-six percent of the salpingectomies were bilateral. In 10% of the cases with bilateral salpingectomy one ovary remained to serve a hormonal function.

Table III  
The Patterns of Salpingo-oophorectomy  
In the Abdominal Hysterectomies (Total 300)

		No. of Tubes Removed		
		0	1	2
No. of ovaries removed	2	0	2	121
	1	2	64	14
	0	91	5	1



Looking at salpingectomy and oophorectomy together, it can be seen that 40% of the abdominal patients had bilateral salpingo-oophorectomy, 21% unilateral salpingo-oophorectomy, and 30% no removal of adnexae. Five percent had 2 tubes and 1 ovary removed, as discussed above. Three percent had other combinations of tubes and ovaries removed, either because the lesions justified this or because part of the adnexae had been removed previously.

The major procedures associated with vaginal hysterectomies were anterior and posterior colporrhaphies. Nearly 90% of the vaginal cases had some repair, with 70% having both anterior and posterior colporrhaphy. (See Table VI)

There were so few cases of vaginal hysterectomy without repair that meaningful results could not have been obtained in comparing the repair and non-repair group for blood loss and morbidity. Twelve of the 13 abdominal cases that were combined with vaginal repair were performed for patients with symptomatic cystocele or rectocele who clearly had contraindications for vaginal hysterectomy; six had enlarged fibroid uteri, 2 had pelvic pain, 3 had ovarian disease, and 1 had endometrial carcinoma.

Fifty-five percent of the abdominal cases had appendicities removed at the time of hysterectomy, 2 with acute inflammation. Many of the other abdominal patients had received previous appendectomies. Thus, incidental appendectomy appears to be a routine part of total abdominal hysterectomy at Yale, despite the fact that some gynecologists have questioned the wisdom of this practice.

Sixty percent of the vaginal and 40% of the abdominal hysterectomy patients had a dilation and curettage at the onset of their operation.



The only complications were 2 incidences of inadvertent perforation of the uterus, resulting in approximately 200 c.c. additional blood loss.

There were 15 cone biopsies performed during the same hospitalization as the hysterectomy for suspected carcinoma in situ, or micro-invasive, of the cervix. If there had been a larger number of cones performed, the associated morbidity would have been analyzed and compared to Laubach's study<sup>21</sup>, which found twice as much significant morbidity after cervical cone biopsy with hysterectomy than after hysterectomy alone.

Table VI shows the frequency of procedures modifying simple hysterectomy; they may be categorized as follows: (1) abdominal hysterectomies other than total abdominal (subtotal abdominal and Wertheim hysterectomies), (2) procedures that commonly accompany abdominal or vaginal hysterectomy (anterior and posterior colporrhaphies, salpingectomy and oophorectomy, and appendectomy), (3) biopsies, (4) cyst removal (ovarian and Bartholin's gland), (5) removal of a mass, (6) abdominal operations for stress incontinence (Marshall-Marchetti and urethral sling), (7) resection of pelvic structures besides uterus and adnexa (vaginectomy and vulvectomy), (8) correction of operative errors (repair bladder tear and bisected ureter), (9) repair of non-gynecologic conditions (herniorrhaphy, rectal prolapse repair).





## INDICATIONS FOR HYSTERECTOMY: INTRODUCTION

### General Indications

Diseases of the Uterine Corpus. The complaint of menometrorrhagia is justification for hysterectomy depending upon the severity and duration of the symptom, a previous dilation and curettage, and unsuccessful trial of hormones, and whether the patient has completed her family. Menometrorrhagia may be due to hormonal dysfunction or subinvolution of the uterus. It is often the most serious complaint of the patient with fibroids. A leiomyomatous uterus, even without menometrorrhagia, warrants hysterectomy if it is rapidly enlarging, if it is the size of a three-month pregnancy, or if it is causing pelvic pain or urinary tract symptoms. Persistent pyometrium, which is a rare occurrence, justifies hysterectomy when antibiotics fail. A patient presenting with acute endometritis, following septic abortion, may also have generalized sepsis and be a very poor operative risk. However, the uterus may be a pus-filled sac and removal essential for the patient's survival.

Adenomyosis presents with menorrhagia, dysmenorrhea, and uterine enlargement. It is only troublesome in premenopausal women. Adenomyosis is found in nearly 20% of uteri, most of which were removed for other causes. 35

Rupture of the uterus may occur as the result of tetanic contractions at labor, often the result of improper administration of oxytocics at induction. Rupture is most likely in the grand-multipara or the patient with previous Caesarean sections. In the past, high forceps delivery was an occasional cause of ruptured uterus. Hysterectomy is usually



the best treatment, although occasionally it is decided to repair the laceration to preserve fertility.

Multiparity is a common reason for hysterectomy, particularly in the clinic population, but also in private patients nearing menopause who dread another child so late in life. With the widespread use of contraceptive pills and intrauterine devices, multiparity should be a less common indication for hysterectomy in the future. However, together with other borderline indications such as moderate dysmenorrhea and mild stress incontinence, hysterectomy may be well justified in the woman who has completed her family.

Endometrial adenocarcinoma is by far the most common malignancy of the body of the uterus. Occasionally it arises from an endometrial polyp. Adenomatous hyperplasia is frankly pre-cancerous, with malignancy developing in 12.5% of patients within 5 to 10 years. <sup>14</sup> Endometrial carcinoma has its peak incidence between 50 and 60 years of age. The remaining tumors, sarcomas and mixed mesodermal, are rare.

Diseases of the Cervix. Cervical stenosis is usually asymptomatic in the post-menopausal woman, but in premenopausal patients, it causes dysmenorrhea, infertility, hematometra (blood in the uterus), and pyometra. Stenosis is caused by infection, cauterization, radium, conization, and senile atrophy. If patency cannot be re-established by uterine sound, then hysterectomy is necessary.

Cervicitis may require hysterectomy if it is associated with persistent leukorrhea or if there are extensive dysplastic changes. Cancer of the cervix in situ or Stage I, microinvasive, is treated by simple total hysterectomy. Radical hysterectomy and bilateral retroperitoneal lymph node dissection is an alternative treatment to radio-



therapy for Stages Ib and Ic. The Wertheim operation, a much more extensive procedure than simple total hysterectomy, results in a greater post-operative morbidity. However, the improvement in long-term survival justifies its use in selected patients.

Diseases of the Ovaries and Tubes. Removal of all ovarian tissue or of both tubes should generally be accompanied by removal of the sterile, potentially troublesome uterus. Ovarian carcinoma, Kruckenberg tumor, and ovarian masculinizing tumors require bilateral oophorectomy, while pelvic inflammatory disease may necessitate bilateral salpingectomy.

Diseases Affecting Multiple Pelvic Structures. Endometriosis is a condition in which endometrial tissue is found in any area of the pelvis outside the uterus. The most common locations are both ovaries and the pouch of Douglas; occasionally it may be found outside the pelvis. It occurs in the age group that desires more children, and in such cases should be treated conservatively unless the symptoms are severe. Hormone therapy has proven to be effective; pregnancy may bring relief of symptoms, but it may be wise for the patient to finish her family quickly. If the pelvic pain, dysmenorrhea, and menometrorrhagia are unresponsive to hormones and incapacitating to the patient, hysterectomy and bilateral oophorectomy become necessary.

Pelvic inflammatory disease is a frequent cause of ectopic pregnancy, sterility, pelvic mass, and pelvic pain. It usually follows inadequately treated gonorrheal infection or septic abortion. Pelvic tuberculosis is rare in the United States.

Pelvic Relaxation. The majority of vaginal hysterectomies are done for a group of symptoms and lesions called pelvic relaxation;



these are cystocele, urethrocele, rectocele, enterocele, prolapsed uterus, stress incontinence, loss of urethrovesical angle, and prolapsed rectum.

Therapeutic Abortion and Sterilization. Therapeutic abortions are justified for medical or psychiatric reasons. If the patient would require therapeutic abortion in succeeding pregnancies, it is sensible to proceed with hysterectomy if (1) she is unable to use contraceptive measures reliably or (2) if she has other gynecologic indications that partially justify hysterectomy.

#### Indications for Vaginal Hysterectomy

Pelvic relaxation, often associated with stress incontinence of urine, is by far the most common indication for vaginal hysterectomy; indeed, the vaginal approach requires sufficient mobility to allow the cervix to be grasped and pulled down nearly to the introitus. Often accompanying this degree of mobility are cystocele, rectocele, prolapse, and stress incontinence, necessitating anterior and posterior colporrhaphies.

Cystocele, urethrocele, or loss of the urethro-vesical angle often result in stress incontinence and occasionally in chronic urinary tract infections. It is important to rule out causes which will not be altered by surgery, such as abnormal detrussor muscle function, Hunnar's ulcer, intravesical lesions, urge and overflow incontinence and inflammatory lesions. Anterior repair in these patients may aggravate urinary symptoms.<sup>35</sup> It is advisable for young women to live with their symptoms and complete their family before undergoing anterior and posterior colporrhaphy. Otherwise, recurrence





of pelvic relaxation is likely.

Rectocele may make it impossible to initiate elimination of stool until the bulge into the vagina has been reduced manually. Enterocoele, a posterior vaginal hernia of small intestine, may be asymptomatic or may leave the patient with back pains and pelvic heaviness.

#### Contraindications to Vaginal Hysterectomy

Previous pelvic surgery is considered by some gynecologists as a contraindication to vaginal hysterectomy. Insufficient mobility of the uterus may be due to the integrity of the supporting fascia muscles and ligaments, or it may be due to adhesions from previous surgery or chronic P.I.D. which fix the uterus to surrounding structures. Several recent studies emphasize that it is the resulting immobility of the uterus which should deter one from vaginal surgery, not the previous pelvic surgery per se.<sup>6,9</sup> Carpenter and Silva compared the operative and post-operative course of 50 patients having vaginal hysterectomy following pelvic surgery with that of 167 patients having had no previous pelvic surgery. As long as no other contraindications were present, vaginal hysterectomy following pelvic surgery proved to have no more complications than vaginal hysterectomy with no previous surgery.

Another contraindication to vaginal hysterectomy is a uterus that is more than  $2\frac{1}{2}$  to 3 times normal size. Leiomyomatous uterus is the most common reason for enlargement. Adenomyosis and pregnancy beyond 10 weeks may cause uterine enlargement to a degree so



as to make vaginal hysterectomy inadvisable. However, when abdominal hysterectomy is strongly contraindicated, an enlarged uterus can be morcellated and delivered vaginally, at the expense of increased blood loss and technical difficulty.

Any condition necessitating the removal of the adnexa--ovarian mass, tubo-ovarian abcess, ectopic pregnancy, and interligamentous fibroids--should not be approached vaginally. Endometrial carcinoma, the minimal treatment for which is abdominal hysterectomy and bilateral salpingo-oophorectomy, is included in this category.

Vaginal hysterectomy is inadequate when abdominal exploration is necessary. A history of pelvic or abdominal pain may be such an indication for exploration. Pelvic inflammatory disease, endometriosis, and a history suggesting appendicitis are other reasons to avoid vaginal surgery in favor of the abdominal approach. <sup>18</sup> Howkins feels that the appendix should be removed if there is a history of appendicitis. He cites a patient that required operation for acute appendicitis five days after hysterectomy. However, he also states that appendectomy is not an entirely benign procedure by presenting a case of intestinal obstruction requiring reoperation. Thus, he is against the practice of routine incidental appendectomy.

#### Indications for Abdominal Hysterectomy

Although the indications for abdominal hysterectomy were detailed in the section on contraindications to vaginal surgery, they bear repeating briefly.

Enlargement of the uterus is the most common indication.



If the uterus is the size of a 3-month pregnancy, is rapidly growing, is associated with pelvic pain or menometrorrhagia, the patient deserves hysterectomy. A patient who desires more children and who has fibroids projecting into the endometrial cavity may be treated by excision of the fibroids rather than removal of the uterus.

Whenever it is necessary to remove both tubes or both ovaries, it is best to remove the uterus, which if left in, is a useless organ subject to disease, such as painful subinvolution, endometrial carcinoma, and cancer of the cervix. The only exceptions are the very old or debilitated patient who may not tolerate the additional stress of hysterectomy, and the young patient who may feel better emotionally with a sterile uterus rather than none at all. The most common disease in the clinic population necessitating removal of both tubes and hence hysterectomy, is pelvic inflammatory disease. Bilateral cystadenomas, ovarian carcinoma, and endometriosis necessitate removal of both ovaries.

Carcinoma of the cervix in the early stages may warrant abdominal hysterectomy with lymph node dissection. This, of course, is more difficult and extensive surgery than simple vaginal or abdominal hysterectomy, and may be unjustified in patients who are poor surgical risks due to other diseases or old age.

Carcinoma of the endometrium is the other common malignancy. It is usually treated with preoperative radium, followed by total abdominal hysterectomy and bilateral salpingo-oophorectomy. Foregoing this procedure for vaginal hysterectomy should be considered a compromise in cases of obesity or additional illness.



### Contraindications to Abdominal Hysterectomy

Obesity makes abdominal hysterectomy a more trying experience for both surgeon and patient. Wound healing is difficult, surgical exposure is not good, and pulmonary complications are increased.

The patient's general condition is another consideration. Patients who are old with major systems disease, especially cardio-pulmonary, may not be able to tolerate abdominal surgery. Many endometrial carcinoma patients are not good surgical risks, but the prospect of long-range cure usually outweighs the increased morbidity of abdominal hysterectomy.

Cystocele, rectocele, or enterocele, requiring vaginal plastic repair, indicates combining abdominal hysterectomy with vaginal surgery, or doing the entire procedure vaginally. The latter is preferable unless contraindications to vaginal hysterectomy are also present. Urinary stress incontinence is usually associated with cysto-urethrocele and some degree of prolapse, and should therefore be treated vaginally. However, if the incontinence is due to decreased urethro-vesical angle, the Marshall-Marchetti procedure, which elevates the urethro-vesical junction to the pubis, allows a completely abdominal operation. Techniques involving suburethral slings of fascia are used, but they are reserved for recurrent disease and they may be associated with the serious complication of urethral fistula.

### Summary

#### Advantages of Vaginal Hysterectomy

(1) Vaginal hysterectomy readily allows for anterior and pos-





terior colporrhaphy.

- (2) Poor risk patients can be done with relatively light anesthesia, with mortality under 1%, and usually with a reasonably smooth post-operative course.
- (3) No scar is created, and this may have some psychological advantage as there is no visible stigmata of the loss of the "female organs."

#### Disadvantages of Vaginal Hysterectomy

- (1) Operative exposure and hemostasis are inferior to that obtained abdominally.
- (2) There is a higher incidence of post-operative fever, vaginal wound infection, and urinary tract infection.
- (3) The adnexa cannot be as adequately inspected for incidental disease.
- (4) The adnexa are more difficult to remove.
- (5) Vaginal stenosis and shortening, with dyspareunia or apareunia, may occur.

#### Advantages of Abdominal Hysterectomy

- (1) It allows adnexal surgery, appendectomy, and exploration of the abdomen.
- (2) It permits lymph node dissection, as in the treatment of cervical carcinoma.
- (3) Exposure is excellent except in cases of obesity.
- (4) Good hemostasis can be obtained.
- (5) The vagina ends up about one inch longer than after vaginal hysterectomy.
- (6) The large uterus can be removed relatively easily, and without resorting to morcellation.

#### Disadvantages of Abdominal Hysterectomy

- (1) The mortality is greater than for vaginal hysterectomy, especially in the poor risk patient.



- (2) Deeper anesthesia is necessary than with vaginal hysterectomy.
- (3) If vaginal plastic repair must be done, this necessitates a combined abdominal and vaginal procedure.
- (4) Wound dehiscence occasionally occurs.
- (5) The patient is uncomfortable post-operatively due to the abdominal incision.
- (6) The patient is left with a scar.



## INDICATIONS FOR HYSTERECTOMY: RESULTS AND DISCUSSION

The chief complaint of the patients who underwent vaginal hysterectomy was most often pelvic relaxation. This category includes any combination of the following: cystocele, urethrocele, stress incontinence, rectocele, enterocele, uterine and rectal prolapse. Eighty-five private vaginal, 74 University vaginal, and 69 ward vaginal patients had the chief complaint in this category. Even those who had hysterectomy for such reasons as menometrorrhagia or multiparity invariably had some pelvic relaxation. Cystoceles were present in 89 private vaginal, 61 University vaginal, and 83 ward vaginal patients. Rectoceles were noted in 73 private vaginal, 42 University vaginal, and 47 ward vaginal women. Enterocèles were noted at pre-operative examination in 2 private, 9 University, and 3 ward patients. There were probably more present, but a small, high enterocele may go unnoticed. A method has been proposed for detecting enterocèles<sup>1</sup> by rectal transillumination. Stress incontinence was a complaint in 45 private, 35 University, and 68 ward patients. This problem was often the only symptom of patients presenting with moderate cystoceles, rectoceles, and enterocèles. Prolapse was present to some degree in 92 private, 61 University, and 36 ward cases. (First degree prolapse means that the cervix has descended partially down the vagina, but not to the outlet. In second degree prolapse the cervix is at the vaginal outlet, and in third degree it is beyond.<sup>36</sup> Although some distinguish a fourth category, procidentia, with inversion of the vagina, the usage is not uniform; therefore



all cases of prolapse with the cervix beyond the introitus were considered third degree.) Twenty-one private, twenty-three University, and 10 ward cases had third degree prolapse. The lesser incidence of prolapse in the ward group is probably due to the fact that these patients were much younger than those of the other two groups. It appears that the multiparous woman in her twenties or thirties, as characterizes the ward patients, will show the rigors of many deliveries by increased stress incontinence, whereas the older patients of the other groups will show the strain of age with its attendant atrophy of fascial and muscle layers by uterine prolapse, which is undoubtedly abetted over the years by the force of gravity.

Leiomyomata were the chief complaint in 38% of the abdominal hysterectomies and 1% of the vaginal hysterectomies. Fibroids were an indication for operation in 48% of abdominal cases. The patients in which fibroids was a secondary indication were usually admitted with the chief complaint of menometrorrhagia. Thus, the larger figure of 48% is indicative of the proportion of patients who have abdominal hysterectomy for fibroids. There were 2 cases in which an enlarged fibroid uterus caused acute urinary retention, necessitating hysterectomy. Occasionally a patient presented with a pelvic or adnexal mass which at operation was found to be a uterine or interligamentous fibroid. Fibroids was an indication for operation in 10 cases in which the pathology report revealed that this was the wrong diagnosis. In 7 of these cases, either fibroids or menometrorrhagia was the chief complaint. This misdiagnosis of the chief indication occurred in 4 private, 1 University, and 2 ward





cases. The corrected diagnoses were symmetrically enlarged uterus (4), paraovarian cyst (1), and endometriosis (2). In all of these cases, hysterectomy was a reasonable procedure despite the misdiagnosis.

Thirteen percent of the abdominal and 9% of the vaginal patients presented with the chief complaint of menometrorrhagia. Thirty-one percent of the abdominal and 16% of the vaginal patients had menorrhagia before hysterectomy; 18% abdominal and 11% vaginal suffered from metrorrhagia. Unfortunately, the terms are used rather loosely, and a patient who was admitted for "menometrorrhagia" would often have prolonged menses, hence menorrhagia. Of the 64 patients whose chief complaint was menometrorrhagia, in 21 the bleeding was probably due to fibroids. Seventy-one percent of these fibroid uteri were removed abdominally. The approach in 3 of the 4 due to ovarian cyst and in 4 of the 5 due to endometriosis was abdominal. Another cause of the menometrorrhagia was adenomyosis--in 6 abdominal and 3 vaginal cases. Adenomyosis is seldom correctly diagnosed preoperatively, but such symptoms as pelvic pain and uterine enlargement suggest approaching hysterectomy abdominally even though no specific diagnosis has been made. The other causes of prolonged or irregular bleeding were endometrial polyps (2), placental polyp (1), adenomatous hyperplasia (4), chronic passive congestion (4), and "functional"--i.e. no tissue etiology (14). The ward vaginal group had 6 cases of menometrorrhagia in which there were no lesions noted on the pathology report. The menometrorrhagia was mild in all these cases and merely an excuse



for removing the uteri of grand multiparous women who averaged more than 6 living children apiece.

Seventeen abdominal hysterectomies were done for the chief indication of pelvic mass. Six were found to be fibroid uteri, 3 large ovarian cysts, and 2 tubo-ovarian abscesses. There were one each of the following: Mullerian duct remnant, Hodgkin's disease involving an ovary and tube, adenocarcinoma metastatic to ovary with undetermined primary, endometriosis of ovary, hydrosalpinx, and a malignant mixed mesodermal tumor of the endometrium.

The 4 hysterectomies done for pelvic pain were appropriately performed abdominally. One was due to hemoperitoneum from a ruptured cyst of the right ovary (which, interestingly, caused left lower quadrant pain). Another was due to an intact ovarian cyst, while a third case had a pre-operative diagnosis of ectopic and a post-operative diagnosis of kinking of the left tube and adhesions. The fourth patient, in which pelvic inflammatory disease had been suspected, turned out to have only a slightly enlarged uterus. The correct pre-operative diagnosis was made in only one of the four patients whose chief complaint was pelvic pain. Such uncertainty of diagnosis, along with the preponderance of ovarian and tubal disease in patients complaining of pelvic pain, was sufficient reason for the abdominal approach in these cases.

Dysmenorrhea was the chief indication in one University abdominal and one University vaginal patient. The symptoms of the abdominal patient were probably due to endosalpingiosis (endo-



metriosis of the tube). The other case had no obvious reason for her dysmenorrhea. Thirty-two patients had dysmenorrhea as one of their indications for operation; 19 were abdominal and 13 were vaginal patients. Twenty-four of the 32 patients were found to have the following lesions that can cause dysmenorrhea--endometriosis (5), ovarian cysts (4), paraovarian cyst (1), salpingitis (4), endocervical polyp (1), enlarged uterus (3), adenomyosis (2), tortuous uterine arteries (1), polypoid endometrial hypertrophy(1), retroflexed uterus (1), and endometrial hyperplasia (1).

Eight cases had the chief complaint of endometriosis; 4 were private abdominal and 4 were University abdominal patients. Three of the 4 patients in each group did have endometriosis, and the other ovarian cysts. Dysmenorrhea or pelvic pain were present in 7 of the 8 patients, but menometrorrhagia was a symptom in only 2 cases. Besides the 8 patients whose chief indication was specifically endometriosis, 3 other patients, whose chief complaint was either pelvic mass or dysmenorrhea, were operated for the lesion of endometriosis. Two had the disease and 1 had a remnant of Mullerian duct tissue. Twelve abdominal patients who had not been suspected of having endometriosis, were assigned it as a post-operative diagnosis. However, this diagnosis was correct in only 7 of the 12 (58%) of these cases. The other 5, according to the pathology report, had ovarian cysts (2), adenomyosis (2), and tubo-ovarian adhesions (1). Nine other patients were found to have endometriosis at pathology report, while the pre-operative and post-operative diagnoses had not mentioned these lesions. Thus, endometriosis appears to be a difficult diagnosis even with direct operative vision.



Ten abdominal patients--3 private, 1 University, and 6 ward-- had the chief indication of chronic pelvic inflammatory disease. Eight of the 10 patients complained of pelvic pain. Twenty-four patients had pelvic inflammatory disease as the primary or one of the secondary indications for operation. Twelve were private, 1 University, and 11 ward patients. Six of the 12 private cases and 2 of the 11 ward cases had no evidence of pelvic inflammatory disease at operation. These misdiagnosed patients had a wide assortment of lesions which also cause pelvic pain--hemorrhagic ovarian cysts, luteum cysts, ectopic pregnancy, endometriosis, and enlarged uterus.

There were 6 therapeutic abortions done for psychiatric reasons. All were done by University physicians, 4 abdominally and 2 vaginally. Five of the 6 patients were white.

Three therapeutic abortions and 4 sterilizations were performed for medical indications. The medical abortions were all for ward abdominal patients. One was for hypertension and chronic pyelonephritis; another for rheumatic heart disease, and the third was a woman who had 2 previous Gargoylian children. The 4 medically indicated sterilizations were done for chronic pyelonephritis, Rh sensitization, hyperparathyroidism (5 children had neonatal tetany), and septate uterus causing frequent abortions.

Multiparity was listed as the chief indication in 25 patients. It was the prime motivation for operation in a far greater number of patients. It was quite obvious why a woman with a small cystocele and rectocele and 8 children was getting a hysterectomy, in spite of the chief complaint being listed as cystocele. Multiparity was the secondary indication.





primary or one of the secondary indications for hysterectomy in 72 patients. Sixty-two (86%) had vaginal hysterectomy, as these patients generally had associated prolapse or stress incontinence. Forty-six of the ward vaginal and 9 of the ward abdominal patients had multiparity as a complaint. Most of the ward hysterectomies in this study were done during the reign of a chief resident who allowed many more hysterectomies on the basis of multiparity than previous or future chiefs.

Four patients presented in the wake of septic abortions. They were all ward patients who were handled abdominally. Two were Italian Catholics and two Negroes. They averaged over 5 pregnancies apiece. Two of the patients presented with acute endometritis, but no generalized sepsis---they responded well to hysterectomy. The other two entered in gram-negative shock--one had a stormy two-week course requiring large amounts of antibiotics, and the other died of a cardiac arrest at the time of hysterectomy.

Ectopic pregnancy was the indication for hysterectomy in 3 patients, all ward abdominal. In each instance, the diagnosis was correct, including one ruptured ectopic. One of the patients was known to have chronic pelvic inflammatory disease, and the other two had previously had an ectopic pregnancy. Thus, all 3 patients had a history clearly putting them in a group more likely to have an ectopic pregnancy than the general population.

Nineteen patients were operated for the chief complaint of ovarian cysts. All were performed abdominally, with 2 on the private, 11 on the University, and 6 on the ward service. The tissue diagnoses were 5 simple cysts (1 of which was hemorrhagic), 2 corpus luteum



cysts (1 of which was hemorrhagic), 4 cases of endometriosis of the ovary, 1 dermoid, and 7 cystadenomas (4 predominantly mucinous and 2 serous). Forty patients had ovarian cysts as one of the indications for hysterectomy. Thirty-nine of the 40 were treated with abdominal hysterectomy. These were evenly divided between the 3 services. Nine of the 40 diagnoses of ovarian cyst were incorrect. At operation, 2 were found to be fibroids, 2 were hydrosalpinx, 1 was tubo-ovarian adhesions, and 4, endometriosis. Ovarian cyst was an additional post-operative diagnosis in 24 cases, 11 abdominal and 13 vaginal. Small cysts of the ovary are common and often asymptomatic, and it is therefore not surprising that the number of incidental cystic ovaries was equal to 77% of the number of initially suspected and confirmed ovarian cysts. As long as a suspicious ovary is "within reach" it should be removed, whether the operation is abdominal or vaginal. It is permissible to be more tolerant with a somewhat cystic ovary in order to leave the premenopausal patient with some ovarian tissue. The advantage of retaining such an ovary must be weighed against the chance of future laparotomy for ovarian disease.

Nine patients had abdominal hysterectomy for ovarian carcinoma. One was a private patient and 4 each were from the other services. All 9 were correctly diagnosed. Seven of the patients had previously had resection of the ovarian carcinoma--6 of these were now being operated for recurrences, and the seventh was having a hysterectomy prophylactically. Of the 2 patients who had not had previous surgery for the malignancy, both were found to have metastatic disease at operation. Resection of these malignant invasive masses was difficult, and the average estimated blood loss was 1300 c.c.



An average of 3.3 units of whole blood was transfused. Post-operative hospital stay was over 13 days, or about 50% longer than for routine abdominal hysterectomy. Eight of the 9 patients had fever, and 6 had urinary tract infections. Four patients required re-hospitalization for complications of the initial hospitalization-- 2 for intestinal obstruction which responded to conservative treatment, 1 for ureterovaginal fistula, and 1 for sacral ulcer requiring skin graft. A tenth patient, who had a pre-operative diagnosis of ovarian cyst, was found to have adenocarcinoma metastatic to the ovary, probably from the intestine.

There was only one other hysterectomy done on the basis of ovarian disease. This was for masculinization presumably due to an arrhenoblastoma. However, the tissue diagnosis was "normal ovaries."

Six hysterectomies were done for the chief complaint of chronic cervicitis. There were secondary indications in all cases, including multiparity (3), menometrorrhagia (1), dysmenorrhea (1), heavy vaginal discharge (1), retroverted uterus (1), enlarged uterus (2), and pelvic relaxation (2). The pathology report in one case was carcinoma in situ despite a pre-operative Class II Papanicolaou smear.

Cancer of the cervix was the indication for hysterectomy in 25 patients. Nineteen (76%) received abdominal hysterectomy. Nineteen of the cervical cancer cases were University patients, and 6 were ward patients, with none being handled by private physicians. Five of the patients (25%) were Negroes. The average age of the patient treated for cancer of the cervix was 40, over 25 years younger than the endometrial carcinoma patient. Eighty percent of



the cervical cancer patients were premenopausal. The average parity was 2.76, which is similar to that of the average patient in this study (excluding the ward vaginal group, with average parity of 6.1). There were 18 cases of carcinoma in situ, 5 of Stage I, and 2 of Stage II.

Four Stage I's, 1 Stage IIA, and one recurrent carcinoma of the endometrium involving the cervix were treated by radical hysterectomy. These 6 patients required an average of 3.3 units of blood. Two Wertheim patients had intestinal obstruction which was treated conservatively, one had a retroperitoneal hematoma, and one had a wound infection. The Wertheim patients had an average post-operative stay of 15 days, while the 18 carcinoma in situ patients treated by simple hysterectomy had an average stay of nine days, which was the same as the average for the entire series of 600 hysterectomies. The Wertheim patients did well, the most severe complication being the abdominal wound infection with its accompanying 17 days of fever. The good results were probably the result of 2 factors: all of the patients were under 50 and the patients had been referred to an outstanding gynecologic cancer surgeon.

Five patients, 4 of whom were postmenopausal, were operated for endometrial hyperplasia. There were 4 cases of adenomatous hyperplasia and one of cystic hyperplasia; all but 1 were approached abdominally. Vaginal bleeding, although present, was not a severe symptom in any of these patients, and it is clear that these hysterectomies were done to remove pre-malignant lesions.

Twenty-six patients, all white, had endometrial carcinoma. All but 1 were post-menopausal, with endometrial carcinoma detected an





average of 18 years after the menopause. Twenty-two (85%) had abdominal hysterectomy. The 4 patients done vaginally had an average age of 80, and 3 of these, with arteriosclerotic cardiovascular disease would have been exceptionally poor candidates for laparotomy. The average age of the abdominal patients was 64. Pre-operative radium insertions were done in 20 (91%) of the abdominal and 3 (75%) of the vaginal patients. Transfusions were required in 4 patients, all abdominal hysterectomies. Seven (32%) abdominal and 2 (50%) vaginal patients had fever, only one of which lasted more than 3 days (an abdominal case). The 4 vaginal patients, despite their age and heart disease, did well post-operatively, while the abdominal cases had 2 intestinal obstructions, 2 abdominal wound infections, and a vaginal cuff abscess.

The remaining 7 chief indications in this series of hysterectomies cover the final 9 patients. There was one hysterectomy for endometrial polyps. However, there was only one polyp and only occasional spotting between menses; furthermore, the patient had more significant lesions--enlarged leiomyomatous uterus, tubo-ovarian adhesions, and a hemorrhagic corpus luteum. This case illustrates how arbitrary and misleading the stated chief indication can be.

The ward abdominal case was operated for hemoperitoneum--?ovarian cyst or ruptured ectopic. A bleeding corpus luteum was found.

One patient had the chief indication of retroverted uterus. Nine others had retroversion and 2, retroflexion as secondary indications. These were generally associated with pelvic pain and dysmenorrhea.

Three cases were related to enlarged or malpositioned uteri causing urinary obstruction; two of these patients had an enlarged myomatous uterus responsible for acute urinary retention, while the



third case was a patient with a previous ventral uterine suspension which was thought to be responsible for her chronic urinary tract infection.

One ward abdominal patient had persistent pyometrium. It is not difficult to believe that her chronic endometritis was beyond medical treatment, as she was a gravida 20, para 10, abortus 10, living children 2.

One ward vaginal patient was operated for the chief indication of cervical stenosis. However, the cervical canal must have been patent, as the uterus had not retained pus or blood. The proper treatment would have been dilatation of the cervical canal, disrupting the endocervical synechiaë. This case was evidently done for multiparity.

One ward abdominal patient had hydatidiform mole, which the pathologist reported as probably benign.

Adenomyosis was not listed as a chief indication for any patient, but was a secondary indication in 9 cases. The diagnosis was incorrect in 8 of the cases (89%). Adenomyosis was an additional post-operative diagnosis 3 times, but was the correct diagnosis only once. There were 49 additional cases in which the pathologist reported adenomyosis. Twenty-five were from abdominal and 24 from vaginal patients. Thus, 8.5% of the 600 patients had adenomyosis, although this bore little relation to symptoms and was treacherous to diagnose.

There are no ruptured uteri and no tuberculosis of the genital tract in this series, but all of the common and many of the rare indications for hysterectomy are present. Furthermore, it is clear



that most of the hysterectomies were well justified, which contrasts with the previous reputation of this operation as often being unnecessary.



## COMPLICATIONS: INTRODUCTION

Both surgical approaches to hysterectomy entail complications, but the patterns of post-operative difficulties are somewhat different. Vaginal hysterectomy, especially when combined with anterior repair, has a high incidence of urinary tract infections. The operative trauma to the bladder and the common use of an indwelling catheter for up to five days post-operatively obviously sets up these patients for urinary infections. Although the majority are cystitis which clears during the hospital stay, occasionally chronic pyelonephritis or bladder contractures develop, necessitating prolonged treatment. Ileus is more likely to occur in abdominal hysterectomy, but serious intestinal obstruction was found in only 0.2 % of abdominal hysterectomy in a series reviewed by Kimball and Bell.<sup>18</sup> Febrile morbidity is higher in vaginal hysterectomies and in typical series has occurred in 30% to 40% of cases, with no apparent cause 50% to 80% of the time.<sup>8</sup>

Abdominal wound infection occurred 3.8% of the time in several recent series of hysterectomies totalling more than 4,000 operations.<sup>18</sup> The analogous problem in vaginal hysterectomy is vaginal cuff infection which is a much more frequent problem.<sup>13</sup> However, it seldom goes on to the more serious pelvic infections--pelvic thrombo-phlebitis or peritonitis. On the other hand, abdominal wound infections may proceed to dehiscence or evisceration.

Pulmonary atelectasis is to be expected in about 2% of abdominal hysterectomies, but rarely in vaginal hysterectomy.<sup>18</sup> This follows, since anesthesia must be deeper in the abdominal operation. Laparotomy





may be more conducive to atelectasis as the patient breathes more shallowly due to incisional pain.

Phlebo-thrombosis of the deep leg veins occurred 1.4% of the time and pulmonary embolism occurred 0.7% following abdominal hyster-  
18 8  
ectomy. In 1000 cases of vaginal hysterectomy, Copenhaver found no deep thrombo-phlebitis, but 7 superficial cases of phlebitis. There was one death in his series from pulmonary embolism.

Damage to the ureters is rare and can be avoided by a good under-  
4  
standing of anatomical relationships and by exposure of the ureters. In-  
jury to the bladder is more often associated with vaginal hysterectomy, but this, too, is a rare complication that can be successfully repaired at the time of the hysterectomy, if recognized. Bowel perforation may occur if severe pelvic adhesions are present. This, too, can be repaired immediately and usually without incident.

Excessive bleeding following hysterectomy has been found to occur in 0.8% to 2.0% of cases in a review of several large series of hyster-  
29  
ectomies. Hemorrhage was more common after vaginal hysterectomy than abdominal, probably because of the better exposure that is afforded by the latter procedure. In a study of 4,421 hysterectomies done at the Mayo Clinic, 4 patients required reoperation for hemorrhage following vaginal hysterectomy, but none after abdominal. Except in those rare cases where re-exploration was necessary, the hemorrhages were found to contri-  
29 36  
bute little to morbidity. Gray reports a recurrence rate of cysto-  
cele (12%), stress incontinence (10%), and rectocele (2%). Stress incontinence develops for the first time in 5% of vaginal patients but usually clears spontaneously or after Kegel exercises.

Recurrence of vaginal prolapse has decreased from about 20% to 3% or 4% in recent years due to improved surgical techniques



and the common inclusion of anterior and posterior repairs.

Stenosis of the vagina can be quite severe following vaginal hysterectomy and is best prevented by resumption of intercourse six weeks after the operation. Otherwise, the stenosis can result in severe dyspareunia or apareunia. At that stage, it may take many months of laborious dilations over glass tubes to refashion an adequate vagina. Since vaginal hysterectomy results in a vagina which is about one inch shorter than after abdominal hysterectomy, some patients complain of occasional pain during deep penetration in the first few months after intercourse is resumed.

Dyspareunia where no vaginal stenosis or excessive shortening is present is also an occasional complaint after hysterectomy. Sometimes an anatomic explanation is afforded by tenting of the vaginal vault due to improper surgical technique. However, most cases of dyspareunia are found in women who were having severe difficulties with marital relations prior to hysterectomy. For normal women, the removal of the uterus does not diminish their sexual enjoyment. In fact, many women enjoy improved relations because of correction of pelvic relaxation, elimination of pelvic pain and the removal of fear of pregnancy. Only rarely does a patient consider herself mutilated by the operation, although it is of interest that several psychiatrists have noted a higher percentage of women with hysterectomies on the mental wards than in the population at large.

Vaginal granulations occur in the vault and along suture lines commonly after vaginal hysterectomy. These patients may present with vaginal bleeding and occasional dyspareunia. More often they are asymptomatic, with granulation noted at the 6-week post-operative



examination, and treated by cauterization with silver nitrate.

The surgically produced menopause which occurs when both ovaries are removed may produce menopausal symptoms such as hot flashes which may respond to estrogens. Sometimes they occur even if ovarian tissue is preserved. This is presumably on a psychogenic basis, as the patient may have confused concepts of what is removed in a hysterectomy. It is therefore important to explain the role of the uterus to the patient; and, if ovarian tissue can be spared, assure her that it preserves her feminine qualities.

Another complication of complete removal of functioning ovarian tissue is vaginal moniliasis and atrophy of the vaginal tissues. Local estrogen creams are helpful.

The unusual complications of hysterectomy warrant brief discussion. <sup>8</sup> Copenhaver had two vesical vaginal fistulas in his series of 1000 vaginal hysterectomies. Rectovaginal and urethral fistulas may also occur. Rarely, a fallopian tube will prolapse into the vagina. This mass can sometimes be removed via the vagina <sup>23</sup> but in other cases requires laparotomy. McGregor and Prior report a case of a ruptured vaginal enterocele with small bowel evisceration occurring ten years after vaginal hysterectomy. There are only 5 <sup>24</sup> other cases in the world literature of vaginal evisceration. McNallis presents a case of vaginal vault rupture and evisceration  $3\frac{1}{2}$  months <sup>10</sup> after abdominal hysterectomy. Dunn and Nash point out that stress ulcers may be seen after gynecological surgery. However, severe stress was a common factor in the three cases they present: a total pelvic exenteration, an ileal conduit construction, and a radical



hysterectomy with lymph node dissection. Bledsoe presents what he claims is the only reported case of fatal acute hemorrhagic pancreatitis following hysterectomy. It probably developed as the result of biliary stasis which, in turn, may have been due to surgical trauma or staphylococcal peritonitis. Smythe<sup>30</sup> performed a hysterectomy leaving the ovaries and tubes intact; a fertilized ovum was apparently in the left tube at the time of operation, causing a ruptured tubal pregnancy 40 days later. Other cases of ectopic pregnancy after hysterectomy are the result of a sinus tract between the peritoneal cavity and the vagina, an open cervical canal<sup>30</sup> in sub-total hysterectomy, or a prolapsed tube.

Tables VII and VIII show the complications that occurred in the present series. The distribution of the complications between different types of patients--abdominal or vaginal, young or old, black or white, ward or private--are discussed in the next section.





## COMPLICATIONS: RESULTS AND DISCUSSION

One-hundred-thirteen patients in this study had no morbidity or complications following hysterectomy (19%). The breakdown among groups was private abdominal--37, private vaginal--20, University abdominal--23, University vaginal--13, ward abdominal--15, and ward vaginal--5

### Febrile Morbidity

The definition of post-operative fever is often taken arbitrarily as an elevation to at least 100.4 F. on 2 post-operative days. Most of the fevers between 100.4 and 101 have been found in previous studies to be unassociated with any discernible disease process, and hence an elevation to 101 has been suggested as more significant in considering post-operative febrile morbidity. In this study, an elevation to 100.4 on 2 post-operative days was selected to be the definition of fever; this allows the results to be compared with other studies.

The post-operative febrile morbidity in this series was markedly greater following vaginal hysterectomy than after abdominal hysterectomy. One-hundred-sixty-four of the vaginal hysterectomy patients (55%) had fever, with 51 private, 44 University, and 69 ward cases. In comparison, only 108 abdominal patients (36%) had a post-operative fever--with 27 private, 35 University, and 46 ward cases. Thus, the vaginal hysterectomy patients had 66% more post-operative fevers than the abdominal group. (See Table XIII.)



The average fever lasted 4.4 days in the vaginal hysterectomy patients and 3.6 days in abdominal groups. The number of vaginal hysterectomy patients with 4 or more days of fever was 102, as compared to only 41 abdominal cases, a  $2\frac{1}{2}$  fold difference. Only 78% of the vaginal patients under age 35, and 56% of those over 35, had post-operative fevers. Forty-two percent of the young abdominal and 47% of the old abdominal patients were febrile. One percent of all patients had more than 9 days of fever, with the longest one 19 days. Thus, excluding the vaginal hysterectomy patients under 35, the other 3 groups--old vaginal, and young and old abdominal--had similar incidences of post-operative fevers, about 50%. It is therefore the young vaginal hysterectomy patients, with nearly 4 out of 5 developing post-operative fevers, that give the vaginal group as a whole a markedly greater rate of febrile morbidity than the abdominal group. It becomes evident that young patients having vaginal hysterectomy do relatively poorly in regard to numerous complications in the post-operative period as discussed from the physiological and sociological basis elsewhere. The long operating times and increased tissue trauma (as evidenced by the excess number of vaginal wound infections in ward cases) may account for the high incidence of fevers in the ward vaginal (and hence in the young vaginal) groups. This reasoning does not hold up for abdominal hysterectomies, where the ward patients do nearly as well as the University and private cases.



### Urinary Complications

In the area of urinary tract infections, this series also shows significant differences between abdominal and vaginal hysterectomy, 18, 25, 32 which bear out previous literature. One-hundred-eighty-nine of the 300 vaginal patients had cystitis or pyelonephritis, whereas there were only 132 in the abdominal cases.

The definition of a urinary tract infection was not as stringent as those in previous studies. Patients with symptoms of cystitis were often treated without obtaining urine culture, especially on the private service. Therefore, it was necessary to rely on the physician's clinical judgment rather than laboratory criteria. There is trauma to the bladder during vaginal hysterectomy and especially during the anterior repair. The resultant difficulty in voiding was routinely handled by five days of indwelling catheter.

Indwelling catheters were used in 94% of the vaginal cases, remaining in place an average of 5 days. The abdominal patients had catheters only 50% of the time, and for an average of 2 days. Forty-three percent of the abdominal patient with catheters had fever, while only 30% of the abdominal patients without catheters were febrile. One-hundred-thirty-two abdominal (44%) and 190 vaginal patients (63%) developed urinary tract infections. Eighty-one of the 148 abdominal patients with catheters developed urinary tract infections (55%). Fifty-one of the 152 abdominal patients without catheters had U.T.I.'s (34%). Thus catheters were associated with a 62% greater rate of urinary infection in the abdominal hysterectomy patients. The catheterized and non-catheterized groups of vaginal hysterectomy cases cannot be similarly compared because all



but 17 patients had a catheter. One-hundred-eighty-four of the 283 vaginal hysterectomy patients that were catheterized (65%) had associated urinary tract infections. Thus, when only catheterized patients are considered, the abdominal cases versus the vaginal cases incidence of urinary tract infections is similar (55% and 65% respectively). It seems likely that most of this difference is due to the catheter remaining in place only 2 days on the abdominal cases, as compared to 5 days for the vaginal patients. Therefore, the higher incidence of U.T.I.'s following vaginal hysterectomy is due to the post-operative instrumentation of the lower urinary tract rather than to the surgery itself. Vaginal surgery then, results only indirectly in more urinary infections. Due to trauma to the urethra and bladder, it is difficult for the patient to void unassisted in the first few post-operative days. If the patients were catheterized only when unable to void, or if suprapubic catheter were employed, one would expect fewer urinary infections. Since a number of the post-operative fevers are secondary to urinary tract infections, there would be a concomitant decrease in this complication.

Urinary retention after post-operative day 5 was predominantly a problem of vaginal hysterectomy. Seventy-six patients (25%) of the vaginal cases had urinary retention; only 9 (3%) of the abdominal cases required the prolonged use of the catheter, and 7 of these were in the University group.

There were two cases, one abdominal and one vaginal, during which the bladder was accidentally lacerated. Fortunately, the complication was recognized immediately and repaired at the time of





hysterectomy without incident.

There was one instance of ureteral damage. It occurred in a University abdominal patient with cancer of the ovary metastatic to the uterus. Although the accidentally bisected ureter was repaired during the operation, she developed a ureterovaginal fistula.

Twenty patients were unable to void at the time of discharge from the hospital and were sent home with catheters in place. Sixteen of these had had vaginal hysterectomies. One of these patients, who had cystocele repair with the vaginal hysterectomy, had dysuria, frequency, and urinary tract infections for four years requiring several drug courses and multiple dilatations of the urethra. Another patient developed a contracture of the vesico-urethral orifice following a persistent post-operative urinary tract infection. Vaginal plastic procedures to improve urinary tract function sometimes result in increased or de novo urinary symptomatology. This may be due to scarring around the meatus or insufficient urethro-vesical angle. Also, after either type of hysterectomy, there is the danger of inadequately treated urinary infections causing serious damage to the lower or upper urinary tract.

#### Wound and Pelvic Infections

Any hematoma of the vaginal cuff that was thought to be infected was classified as a vaginal wound infection. Of the 64 patients who developed vaginal infection or hematoma, 57 had undergone vaginal hysterectomy; 9 were private, 15 University, and 33



ward vaginal cases. Of the 7 abdominal hysterectomies followed by vaginal hematoma or infection, there were 1 private, 2 University, and 4 ward cases. Of the 300 vaginal hysterectomies in the series, 198 received vaginal packing at the end of the operation. Thirty-two of these patients (16%) developed vaginal infections or hematomas, compared to 25 developing the complication who were not packed (26%). The rates of complication in the 2 groups are not significantly different. Thus, one cannot conclude that vaginal packing affects the chance of a patient developing a vaginal collection. Five patients in the series developed more deep-seated pelvic infections. Four of these were vaginal patients (2 private and 2 ward), and 1 was a private abdominal patient. Three of the 5 patients with pelvic infection were reoperated upon for drainage or re-suturing, while a fourth patient developed peritonitis. All 5 had fever and antibiotic courses, while 4 had prolonged hospital stays.

Two cases of peritonitis followed vaginal hysterectomy, 1 University and 1 ward case. One developed from a pelvic infection and the other from a vaginal infection.

There were 17 abdominal wound infections following the 300 abdominal hysterectomies, for an incidence of 5.7%. One was private, 5 were University, and 11 were ward cases. In none of these patients was there significant dehiscence.

Thus, ward patients had a distinctly higher rate of both abdominal and vaginal wound infections.



### Hemorrhages and Transfusions

There were 13 hemorrhages in this series, ranging from 100 c.c. vaginal bleeds to intra-abdominal hemorrhages of 3000 c.c. Two of the bleeds occurred in abdominal patients--one was intra-abdominal and the other vaginal. Among the vaginal hysterectomy patients there were 11 hemorrhages, 10 vaginal and 1 intra-abdominal. Seven of the 10 vaginal hemorrhages following vaginal hysterectomy occurred in the ward patients, while both massive intra-abdominal hemorrhages were in private patients.

Half of the ward abdominal patients were transfused at operation while only one quarter of the private and University abdominal groups received blood. Such differences among the 3 services were not found in the vaginal hysterectomy patients. The average size of transfusion was 800 to 1000 c.c. in all the groups except University abdominal. Most of the 24 University abdominal patients that received blood at the time of surgery were cancer cases with high blood loss, which is why their average transfusion was  $\frac{1}{2}$  unit greater than that of the other 500 patients in the study.

### Thrombophlebitis and Embolism

In most studies, thrombophlebitis has been found more commonly after abdominal hysterectomy. The rate of thrombophlebitis was low in this series of hysterectomies; it occurred in only 2 abdominal and 4 vaginal patients. There were no cases among the ward patients. As the University and private vaginal patients average nearly 10 years older than the respective abdominal groups, the greater incidence of thrombophlebitis in those 2 vaginal groups may be due more to the condition of the patient than to the opera-



tive procedure. In any event, there are not enough cases of thrombophlebitis to conclude which approach to hysterectomy it is more likely to follow. Three patients, all private cases, developed pulmonary embolism or infarction secondary to thrombophlebitis. This was fatal in 1 vaginal and 1 abdominal case.. Another abdominal patient developed pulmonary embolism secondary to pelvic thrombophlebitis but recovered.

### Intestinal Obstruction

Twenty patients developed intestinal obstruction, 16 during the initial hospitalization, and 4 at a later date requiring a second admission. Of the 17 obstructions occurring in abdominal hysterectomy patients, 4 needed only intravenous feeding, 10 required Cantor tubes, and 3 required laparotomy. One of those requiring operation was one week post-hysterectomy, while the other 3 developed adhesions months or years later. One of three vaginal patients with obstruction required laparotomy.

Thus, intestinal obstruction was predominantly a complication of the abdominal hysterectomies, and at times resulted in a second major operation. Furthermore, there were undoubtedly many abdominal patients with slight degree of post-operative ileus which made their convalescence uncomfortable.

### Deaths

Four patients in this study died as the result of hysterectomy (.67%). There were abdominal cases, giving this approach a 1.0% mortality, while one followed vaginal hysterectomy (.33%) mortality).





36  
tality ranging from 0.2% to 1.4%; the mortality rate in most series of vaginal hysterectomies is a fraction of 1%. The present study therefore has a mortality rate comparable to other series.

The vaginal patient died of pulmonary infarction secondary to thrombophlebitis of the deep leg veins. An abdominal patient had a fatal cardiac arrest due to either pulmonary emboli or coronary disease. A septic abortion patient who entered the hospital in gram-negative shock could not be resuscitated by open chest massage after arresting during hysterectomy. The fourth death in the series was iatrogenic. A sponge left in the abdomen caused severe intestinal obstruction necessitating re-operation, at which time the patient had a myocardial infarction, dying 12 hours later.

#### Rehospitalization and Re-operation

Forty-eight patients in the study (8%) either had to be taken back to the operating room or re-hospitalized due to complications of hysterectomy. Also included in this group were patients requiring an operation subsequent to hysterectomy for disease in a structure that could have been removed originally (i.e., an ovary that later developed cysts).

Of the 30 patients who required a second operation, 8 were done during the same hospital stay as their hysterectomy, and 22 on a subsequent admission. The patients that had to return to the operating room came from the following groups: 6 private abdominal, 4 private vaginal, 1 University abdominal, 3 University vaginal, 5 ward abdominal, and 11 ward vaginal.

Thirty patients required a second operation procedure for the following causes: 2 incisional hernias, 4 intestinal obstruction, 7



vaginal hemorrhages, 2 intra-abdominal hemorrhages, 2 septic vaginal hematomas, 2 septic pelvic hematomas, 3 recurrent and 2 new stress incontinence, 3 ovarian cysts, 2 appendicitis, 1 prolapsed fallopian tube, and 1 ulcer in the sacral region due to an iodine burn.

The excess number of ward vaginal patients returned to the operating room was composed of 5 vaginal hemorrhages.

The 2 massive intra-abdominal hemorrhages did well after laparotomy. One was a private abdominal patient who bled approximately 3000 c.c. from an adnexal stamp; the other was a private vaginal patient who bled nearly 2000 c.c. from the round ligament.

Eighteen patients, half abdominal and half vaginal, were re-hospitalized. They had the following complications: massive pulmonary emboli due to ?pelvic vein thrombophlebitis (1), pulmonary infarction secondary to thrombophlebitis of the legs and resulting in death (1), pelvic hematoma (1), peritonitis (1), vaginal hemorrhage (2), septic vaginal hematoma (2), wound infection (2), intestinal obstruction (2), urinary retention (2), pyelonephritis (1), uretero-vaginal fistula (1), rectovaginal fistula (1), and pneumonia (1).

Those cases that were rehospitalized and treated medically were often more seriously ill than the re-operated group (e.g., pulmonary emboli as compared to suture ligation of vaginal bleeding). Of the 48 patients discussed in this section, half were ward patients (15 vaginal and 9 abdominal). Thus, the ward patients had many major complications after hysterectomy, and this was particularly true of the ward vaginal group.



TABLE IV

	<u>Re-operation</u>	<u>Rehospitalization but no re-op.</u>	<u>Total</u>
PA	6	2	8
UA	1	3	4
WA	5	4	9
PV	4	1	5
UV	3	4	7
WV	11	4	15

### Young v. Old Patients

In an attempt to compare the young and old patients with respect to post-operative courses, patients under 36 or over 60 were selected. These age groups are the same as those in a study by Pratt and Galloway<sup>25</sup>. They reviewed only vaginal hysterectomies, whereas abdominal cases are also included in the present study.

Of the 600 Yale cases; there were 82 vaginal hysterectomy patients under 36, 56 (68%) of whom were on the ward. Of the 71 vaginal hysterectomy cases over 60, 43 (61%) were University patients. The young vaginal hysterectomy patients compared to the old vaginal hysterectomy patients had a 24% greater incidence of urinary tract infections, 74% more urine retention, 215% more vaginal wound infections, 70% more post-operative fevers, and 61% more had transfusions during or after operation. Thus, the greater difficulty experienced by the young patient after vaginal hysterectomy is found in the present series, as it was in the cases reported by Pratt and Galloway.

Table XVI shows little difference in the incidence of complications in young and old abdominal hysterectomy patients except that there was nearly twice the rate of urinary tract infection in the older patients. Thus, assuming the patients are suitable candi-



dates for surgery, age is an important factor in vaginal hysterectomies but not in abdominal. The reason young vaginal hysterectomy patients have increased blood loss, wound infections, and fever is that the tissues involved in the operation are much more vascular. With hemostasis and exposure relatively inferior in vaginal surgery, the vascularity becomes a significant factor in the course of the operation, while the excellent hemostasis and exposure afforded by abdominal surgery minimizes the impact of the increased vascularity in the young.

#### Black v. White Patients

The comparison of black and white patients for complications of hysterectomy was confined to the ward groups, which contained 86% of the Negro patients. (See Table XVIII). Forty-seven of the ward vaginal patients and 61 of the ward abdominal patients were black. The incidences of fever and cystitis were similar for both races. Seven of the 8 cases of pyelonephritis occurred in black patients, although they comprised only 54% of the ward cases. Vaginal wound infections occurred in over one-third of the black vaginal patients, twice the rate as in the white group. The Negroes had 9 abdominal wound infections (15%) compared to 2 (5%) in the whites. Fifty-seven percent of the Negro abdominal patients as compared to 36% of the whites had transfusions at hysterectomy or post-operatively. The explanation for the greater number of Negroes needing blood is that those suffering from menometrorrhagia enter the hospital more anemic than the whites.

Thus, race does not appear to be a major factor in post-





operative morbidity in this series, with the exception of vaginal wound infection, which was significantly more frequent in blacks.



## SUMMARY

Six-hundred hysterectomies performed at Yale-New Haven hospital, most in the years 1962-65, were reviewed for indications, operative complications, and post-operative morbidity. There were 300 abdominal and 300 vaginal cases. Wertheim hysterectomies were included, but no pelvic exenterations were considered. The two types of hysterectomy cases were drawn equally from ward, University, and private cases to determine if the morbidity of hysterectomy was dependent on socio-economic factors.

The logic behind the choice of approach to hysterectomy was usually clear-cut. Three-fourths of the vaginal hysterectomies were done for uterine prolapse, stress incontinence, or cysto-rectocele. Since vaginal plastic repair was necessary, vaginal hysterectomy was the suitable procedure.

The most common reasons for doing abdominal hysterectomy were leiomyomatous uterus (38%), gynecologic cancer (17%), and menometrorrhagia (13%).

The vaginal cases had 50% more post-operative fevers and 40% more urinary tract infections than the abdominal group. It is felt that the incidence of urinary tract infections after vaginal hysterectomy would approach that of the abdominal group if the Foley catheter were used minimally. This would decrease but not eliminate the disparity in fevers between the 2 groups as many of the post-operative fevers are due to urinary tract infections.

The abdominal hysterectomy patients had 18 of the 20 cases of intestinal obstruction, and 3 of the 4 deaths in the series.



The ward vaginal cases had a disproportionately high number of fevers, vaginal wound infections and vaginal hemorrhages. The ward abdominal cases had significantly more wound infections, and transfusions than the other 2 services. Other than these differences, the ward, private, and University patients fared similarly following hysterectomy.

The knowledge of the types of complications to expect following the 2 approaches to hysterectomy is useful for the following reasons:

- (1) It will help in deciding on the approach to hysterectomy in a patient that could be operated either abdominally or vaginally.
- (2) The knowledge of what complications are most likely in a given patient is the first step in preventing or minimizing them. The application of this concept to urinary tract infections has been discussed.



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TABLE V

## CHIEF INDICATION FOR HYSTERECTOMY

	PA	UA	WA	TOTAL	PV	UV	WV	TOTAL
					<u>85</u>	<u>74</u>	<u>69</u>	<u>228</u>
Pelvic relaxation	3	1	0	4				
Pelvic mass	6	3	8	17				
Hemoperitoneum	0	0	1	1				
Retroversion of uterus					1	0	0	1
Cervical stenosis					0	0	1	1
Menometrorrhagia	20	6	12	38	7	10	9	26
Pelvic pain	2	1	1	4				
Dysmenorrhea	0	1	0	1	0	1	0	1
Urinary obstruction due to enlarged uterus	2	0	1	3				
Leiomyomatous uterus	50	26	39	115	2	1	0	3
Endometrial polyps	1	0	0	1				
Endometriosis	4	4	0	8				
Chronic P.I.D.	3	1	6	10				
Persistent pyometrium	0	0	1	1				
Therapeutic abortion (psychiatric)	0	4	0	4	0	2	0	2
Therapeutic abortion (medical)	0	0	3	3				
Sterilization (medical)	1	1	0	2	0	0	2	2
Multiparity	0	1	3	4	3	3	15	21
Septic abortion	0	0	4	4				
Ectopic pregnancy	0	0	3	3				
Ovarian cyst	2	11	6	19				
Masculinization (ovarian etiology)	0	1	0	1				
Ovarian carcinoma	1	4	4	9				
Chronic cervicitis	2	0	0	2	0	3	1	4
Cancer of the cervix	0	15	4	19	0	4	2	6
Adenomatous hyperplasia of endometrium	0	2	2	4	0	1	0	1
Endometrial carcinoma	3	18	1	22	2	1	1	4
Hydatid mole	0	0	1	1				





TABLE VI

## PROCEDURES MODIFYING SIMPLE HYSTERECTOMY

	<u>PA</u>	<u>UA</u>	<u>WA</u>	<u>PV</u>	<u>UV</u>	<u>WV</u>
Wertheim or modified Wertheim hysterectomy	0	6	0	--	--	--
Wide hysterectomy	0	3	0	--	--	--
Subtotal abdominal hysterectomy	1	3	2	--	--	--
Anterior colporrhaphy only	2	1	0	11	8	26
Posterior colporrhaphy only	3	3	2	1	9	1
Anterior and posterior colporrhaphy	3	0	1	80	70	59
Unilateral salpingectomy	31	17	23	4	2	2
Bilateral salpingectomy	38	53	45	2	2	0
Unilateral oophorectomy	34	17	29	4	4	2
Bilateral oophorectomy	34	52	37	1	3	0
Appendectomy	57	52	57	--	--	--
Biopsies	4	2	4	2	1	0
Ovarian cystectomy or wedge	7	3	3	1	1	1
Bartholin's gland cystectomy	1	1	0	2	0	0
Excision of adnexal peritoneal cysts	1	0	1	0	1	0
Excision of mass	1	0	1	0	1	0
Marshall-Marchetti procedure	1	1	4	--	--	--
Urethral sling	0	1	0	--	--	--
Vaginectomy	--	--	--	1	6	4
Partial simple vulvectomy	--	--	--	0	1	0
Repair bladder torn during hysterectomy	1	0	0	0	0	1
Repair bisected ureter	0	1	0	--	--	--
Anastomosis of bisected ileum	--	--	--	0	1	0



TABLE VI

PROCEDURES MODIFYING SIMPLE HYSTERECTOMY  
(continued)

	<u>PA</u>	<u>UA</u>	<u>WA</u>	<u>PV</u>	<u>UV</u>	<u>WV</u>
Wedge resection of terminal ileum	0	3	0	--	--	--
Resection of sigmoid and sigmoid colostomy	0	0	1	--	--	--
Transverse colostomy	0	0	1	--	--	--
Resection of exteriorized rectum and re-anastomosis of rectum				0	3	0
Rectal dilatation	0	1	0	0	0	1
Hemorrhoidectomy						
Cystoscopy	1	2	0	1	0	2
Ureteral catheter	1	0	0	--	--	--
Culdocentesis	0	0	3	--	--	--
Inguinal herniorrhaphy	0	1	0	0	1	0
Umbilical herniorrhaphy	0	1	5	2	1	0
Femoral Herniorrhaphy	0	1	0			
Incisional herniorrhaphy	0	0	1			
Sacral neurectomy	0	1	0			
Excision of ureteral stone	0	1	0			
Partial omentectomy	1	0	0			
Drainage of cervical abscess	1	0	0			



TABLE VII

## MAIN COMPLICATIONS OF HYSTERECTOMY

	PA	UA	WA	TOTAL	PV	UV	WV	TOTAL
	28	35	45	108	51	44	70	165
Fever of at least 100.4 on 2 days	1	1	0	2	3	1	7	11
Hemorrhage	1	1	0	2	2	3	1	6
Hypovolemic shock	0	0	1	1	1	1	0	2
Septic shock	0	0	2	2	4	2	6	12
Vaginal cuff hematoma								
Vaginal wound infection	1	2	2	5	6	13	26	45
Abdominal wound infection	1	5	11	17	0	0	0	0
Pelvic infection	1	1	0	2	2	0	2	4
Peritonitis	0	0	0	0	0	1	1	2
Intestinal obstruction	3	6	8	17	1	1	1	2
Phlebitis--no anticoagulants used	1	0	0	1	0	2	0	2
Phlebitis--anticoagulants used	1	0	0	1	1	1	0	2
Atelectasis	0	2	5	7	0	1	0	1
Pneumonitis	1	2	5	8	2	2	2	6
Pulmonary infarction	0	0	0	0	0	1	0	1
Pulmonary embolism	2	0	0	2	0	0	0	0
Urinary tract infection	32	56	44	132	45	72	72	189
---pyelonephritis	1	5	3	9	3	2	5	10
Urinary retention	1	7	1	9	30	22	24	76
Bladder injury	1	0	0	1	0	0	1	1
Ureter injury	0	1	0	1	0	0	0	0
Antibiotic therapy	25	45	57	127	56	65	68	189
Recurrent cystocele	--	--	0	0	--	--	2.4%	2
Recurrent rectocele	--	--	0	0	--	--	8.5%	4
Recurrent enterocele	--	--	0	0	--	--	0	0
Vaginal stenosis	--	--	0	0	--	--	2	2
Lyspareunia	--	--	0	0	--	--	4	4
Granulation tissue in vagina	--	--	3	3	--	--	10	10
Death	0	1	2	3	0	1	0	1



TABLE VIII

## INFREQUENT COMPLICATIONS OF HYSTERECTOMY

	PA	UA	WA	PV	UV	WV
Incisional Hernia	2	0	0	0	0	0
<del>Hemato-perforation</del>	0	0	2	--	--	--
Perforation of uterus at dilation and curettage	0	0	1	0	0	1
Intrauterine pregnancy inadvertently interrupted	0	0	0	0	0	1
Tracheitis due to traumatic intubation	1	0	0	1	0	0
Spinal headache	0	0	1	0	0	1
Medication reaction	0	4	3	3	2	5
Transfusion reaction	1	1	0	1	0	5
Prolapsed tube	0	0	0	0	0	1
Rectovaginal fistula	0	0	1	0	0	0
Retroperitoneal hematoma	0	0	0	0	0	1
Acute gastric dilatation	0	1	0	0	0	0
Parametritis	0	0	1	0	0	0
Osteitis symphysis pubis	0	0	1	0	0	0
Contracture of vesico-urethro orifice due to infection	0	0	0	0	0	1
Dysuria treated with several dilatations	0	0	2	0	0	0
Cardiogenic shock	0	1	0	0	0	0
Transient cardiac arrhythmias	1	2	0	0	1	1
Severe asthma attack	0	1	0	0	0	0
Pleural effusion	0	0	0	0	0	1
Prolonged incisional pain	0	1	1	--	--	--
Monilial vaginitis within 3 months of hysterectomy	--	--	1	--	--	1
Hot flashes	--	--	3	--	--	0





TABLE IX

## PELVIC RELAXATION PRESENT BEFORE HYSTERECTOMY

	<u>PV</u>	<u>UV</u>	<u>WV</u>	<u>PA</u>	<u>UA</u>	<u>WA</u>
Cystocele	89	61	83	5	2	8
Urethrocele	17	8	18	2	0	0
Rectocele	73	42	47	4	1	4
Enterocoele	2	9	3	0	0	0
Prolapsed uterus	92	61	36	5	0	2
Stress incontinence	45	35	68	7	4	6

TABLE X

THE PROBABLE CAUSE OF BLEEDING IN PATIENTS  
WITH CHIEF COMPLAINT OF MENOMETRORRHAGIA

	<u>PA</u>	<u>UA</u>	<u>WA</u>	<u>PV</u>	<u>UV</u>	<u>WV</u>	<u>Total</u>
Leiomyomata	8	1	6	2	3	1	21
Ovarian cyst	1		2	1			4
Endometriosis	2	2		1			5
Adenomyosis	2	2	2		2	1	9
Endometrial polyp	2						2
Placental polyp			1				1
Adenomatous hyperplasia	1	1		1		1	4
Chronic passive congestion	1		1	1	1		4
"Function" (no specific etiology)	3			1	4	6	14
Total	20	6	12	7	10	9	64



TABLE XI  
TYPE OF ANESTHESIA FOR HYSTERECTOMY

	General	Spinal	General and Spinal	Peridural
PA	89	8	0	3
PV	91	6	1	2
UA	92	7	0	1
UV	83	12	1	4
WA	87	7	1	5
WV	35	56	4	5

TABLE XII  
PRE-OPERATIVE TRANSFUSIONS

	Number of units transfused					Total number of patients transfused
	1	2	3	4	5	
PA		3				3
PV						0
UA		2	2			4
UV						0
WA	1	4	2	2	1	10
WV		1				1

TABLE XIII  
FEBRILE MORBIDITY

	No. of days with fever of at least 100.4°F.									Total no. of patients with fever	Duration of Average fever
	2	3	4	5	6	7	8	9	> 9		
PA	17	4	1	3	0	0	1	1	0	27	3.0
PV	16	7	16	7	3	0	0	0	2	51	3.8
UA	13	9	5	3	2	1	0	1	1	35	3.8
UV	5	8	9	7	8	3	1	1	2	44	5.0
WA	15	9	8	6	3	1	2	1	1	46	3.9
WV	12	14	11	13	10	6	2	1	0	69	4.4



TABLE XIV

## TRANSFUSIONS AT HYSTERECTOMY (INCLUDING RECOVERY ROOM)

	Number of units transfused						Total no. patients transfused	Total units of blood	Size of average transfusion(c.c.)
	1	2	3	4	5	6			
PA	11	13	1				25	40	800
PV	18	13	3	1			35	57	815
UA	9	7	3	3		2	24	56	1165
UV	11	9	2	1	1		24	44	915
WA	18	20	7	2	1	1	49	98	1000
WV	16	15	5		2		38	71	935

TABLE XV

## TRANSFUSIONS POST-HYSTERECTOMY

	Number of units transfused										Total number of patients transfused
	1	2	3	4	5	6	7	8	9	10	
PA	1	1					1				3
PV	2	3	1		1						7
UA	4	2									6
UV	2	3									5
WA	1	1							1		3
WV	3	3		1	1						8



TABLE XVI

## COMPARISON OF PATIENTS UNDER 36 AND OVER 60

## FOR POST-OPERATIVE MORBIDITY

	Vaginal Hysterectomy Patients			Abdominal Hysterectomy Patients		
	Younger than 36	Older than 60		Younger than 36	Older than 60	
	No.	%	No.	No.	%	No.
Cystitis or pyelonephritis	60	73	42	18	31	19
Urine retention 15 days	6	7.3	3	1	1.7	0
Vaginal wound infection	22	27	6	3	5.1	1
Abdominal wound infection	--	--	--	5	8.5	2
Fever	63	77	32	30	51	15
Transfusions at and post op.	28	34	15	25	42	12
Average post op. stay (days)	9	--	10	8	--	11.5
Number of private patients	10	12	23	16	27	2
Number of University patients	16	20	43	14	24	21
Number of ward patients	56	68	5	29	49	9
Total number of patients	82	100	71	59	100	32





TABLE XVII  
COMPARISON OF YOUNG AND OLD PATIENTS FOR BLOOD LOSS AND FEVER

Patients Under Age 35						Patients 35 and Over			
	Number of patients	Average EBL	% with fever	Average post-op stay(days)	Number of patients	Average EBL	% with fever	Average post-op stay(days)	
PA	15	510	27	8.4	85	540	47	9.0	
PV	7	600	71	9.1	93	620	54	9.8	
UA	12	690	50	7.9	88	570	49	9.3	
UV	13	530	77	8.1	87	600	53	9.5	
WA	28	690	68	8.1	72	600	46	9.3	
WV	49	600	80	9.2	51	690	65	9.6	



TABLE XVIII

## COMPLICATIONS OF BLACK AND WHITE WARD PATIENTS

	Ward Vaginal Patients				Ward Abdominal Patients			
	Negro(47)		White(53)		Negro(61)		White(39)	
	No.	%	No.	%	No.	%	No.	%
Fever	33	70	37	70	30	49	15	38
Urinary tract infections	32	68	41	77	26	43	18	46
-----Pyelonephritis	4	8.5	1	1.9	3	4.9	0	0
Vaginal wound infection	17	36	9	17	2	3.3	0	0
Abdominal wound infection	--	--	--	--	9	15	2	5.1
Transfusions required at or post-op.	19	40	19	36	35	57	14	36
Urinary retention beyond 5 days	8	17	16	30	26	43	18	46









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